8.0 Post-Construction Monitoring Program

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8.1 Introduction

The city's watershed approach to improving water quality includes a water quality monitoring program that enables the city to understand overall stream conditions and track changes in water quality over time. Although not legally required, the city's comprehensive water quality monitoring program is an important component of the city's ongoing commitment to stewardship of our streams.

When implemented, the CSO control measures will improve water quality. This section describes the city's program for conducting post construction monitoring studies related to CSO control measures, as it fits into the city's broader water quality monitoring program. The Post-Construction Monitoring Program will document the effectiveness of the city's overall CSO control program in achieving design requirements and water quality goals. The CSO Post-Construction Monitoring Program includes the following elements:

- Actions to determine whether CSO control measures are meeting the Performance Criteria in Table 7-5;
- Actions to assess the environmental benefits attributable to CSO control measures and to determine whether the city's CSO discharges are complying with the water quality-based requirements of the city's NPDES permits;
- A monitoring schedule, sampling locations, and associated monitoring procedures to collect data related to the Performance Criteria and the impacts from CSOs on dissolved oxygen and *E. coli* levels in CSO-impacted receiving streams; and
- Evaluation and analysis of the monitoring data to determine whether CSO control measures are achieving the desired results and for reporting progress to regulatory agencies and the public.

The program will monitor the performance of CSO control measures on a watershed basis, as well as assess the program's overall effectiveness in improving water quality and capturing sewage (i.e., 97 percent capture/2 overflow events on Fall Creek and 95 percent capture/4 overflow events on White River, Pogues Run, Pleasant Run and Eagle Creek in a typical year.) The frequency of CSO overflow events will vary year-to-year because of variation in annual rainfall. Where the level of control is 4 overflow events per typical year, actual overflow frequency is expected to range from 0 to 10 overflow events per year; where the level of control is 2 overflow events per typical year, the actual frequency is expected to range from 0 to 6 overflow events per year. The Department of Public Works (DPW) will compile monitoring results, submit milestone reports to the regulatory agencies, and report progress to the public.

8.1.1 Regulatory Requirements

U.S.EPA requires CSO communities to conduct a post-construction monitoring program during and after LTCP implementation "to help determine the effectiveness of the overall program in meeting [Clean Water Act] requirements and achieving local water quality goals."[1] This program should collect data that measure the effectiveness of CSO controls and their impact on water quality, and should utilize existing monitoring stations used in previous studies of the waterways and sewer system in order to compare results to conditions before controls were put in place. The program should include a map of monitoring stations, a record of sampling frequency at each station, a list of data to be collected, and a quality assurance/quality control (QA/QC) plan.

In U.S.EPA's December 2001 Report to Congress: Implementation and Enforcement of the Combined Sewer Overflow Control Policy, the agency noted the difficulty of establishing a monitoring and tracking program for CSO control programs. "Monitoring programs need to be targeted and implemented in a consistent manner from year to year to be able to establish pre-control baseline conditions and to identify meaningful trends over time as CSO controls are implemented," the report said. "In practice, it is often difficult, and in some instances impossible, to link environmental conditions or results to a single source of pollution, such as CSOs. In most instances, water quality is impacted by multiple sources, and trends over time reflect the change in loadings on a watershed scale from a variety of environmental programs." The report also noted that weather con-

[1] *Combined Sewer Overflows, Guidance for Long-Term Control Plan* (EPA 832-B-95-002, August 1995) p. 4-15.

ditions and rainfall totals vary significantly from storm to storm and year to year, making comparisons difficult.

8.1.2 Purpose and Scope

The post-construction monitoring program will collect data needed to document stream improvements that can be attributed to implementation of CSO control measures by the City of Indianapolis, to evaluate whether CSO control measures have met Performance Criteria, and to evaluate whether the city's CSOs comply with the NPDES permits. In order to enable comparisons to historic data, the city will integrate the required CSO post-construction monitoring program into its current ongoing monitoring programs. The scope of the post-construction monitoring program includes preparation and execution of a monitoring plan, as well as evaluation of the effectiveness of CSO control measures. Watersheds or receiving waters included in this plan are Fall Creek, Pogues Run, Pleasant Run, Bean Creek, Eagle Creek, Little Eagle Creek, Lick Creek, and White River. The monitoring program has been developed based upon the following scope of work:

- Document Current Baseline Conditions: During planning and preparation of the long-term control plan, Indianapolis completed a comprehensive watershed assessment documenting water quality conditions in major CSO-impacted receiving streams, as well as estimated pollutant loads for all major watersheds. This assessment established baseline conditions within watersheds and in-stream water quality data, as documented in Section 2.

- Identify Parameters of Concern: The city evaluated various CSO control measures to analyze their ability to improve receiving stream water quality for specific parameters of concern, as described in Section 4. During the development of the LTCP and discussions with U.S. EPA and IDEM, the city identified dissolved oxygen and *E. coli* bacteria as the parameters of concern. The city will use dissolved oxygen and *E. coli* bacteria (or other applicable pathogen or pathogen indicator as described below) to measure the effect of its long term CSO control measures on receiving streams.

- Prepare and Execute Post-Construction Monitoring: The monitoring program will evaluate whether specific CSO control measures are performing as designed and constructed. It identifies how the city will collect data needed to document stream improvements and any pollutant reduction achieved through implementation of CSO control measures. Sections 8.2 through 8.5 further describe the city's post-construction monitoring plan.

- Report Results to State and Federal Agencies: The results of the monitoring program will be reported to the U.S.EPA and IDEM. After completion of the CSO projects in a particular watershed, the city will prepare milestone reports that evaluate whether the constructed projects have achieved the desired results. Section 8.6 presents the city's approach for tracking and reporting on the achievement of design and performance criteria described in Table 7-5.

- Provide Public Information on Water Quality: Information from the monitoring program will be available to Indianapolis citizens, businesses, neighborhood associations and environmental organizations. This information will allow the public to be better informed and educated about the city's water quality improvement programs and water quality issues.

8.2 Program Elements

The city will construct long-term CSO control measures according to the implementation schedule presented in Table 7-5 in Section 7. Upon Achievement of Full Operation in each watershed, the CSO control measures will be monitored and evaluated on a watershed basis to determine whether the Performance Criteria in Table 7-5 have been achieved and the effect on receiving stream water quality.

8.2.1 Performance Criteria

Performance Criteria are those used to assess the performance of CSO control facilities, and CSO control measures will be designed and constructed to meet the Performance Criteria established in Table 7-5. The city will monitor CSO outfalls as described in this section to demonstrate that the Performance Criteria have been met.

Table 8-1 illustrates how the CSO Control Measures in Table 7-5 will be monitored and assessed by watershed. The city will carry out this evaluation by collecting precipitation and CSO outfall monitoring data for 12 months following the Achievement of Full Operation of all CSO control measures in each watershed. Following collection system model validation using the monitoring data, a continuous simulation based upon a five-year simulation period will determine "typical year" performance within the watershed for CSO volume, overflow frequency and percent capture. The Lower Pogues Run and Eagle Creek watersheds require

Table 8-1
Post-Construction Monitoring for CSO Control Measures by Watershed

Watershed	CSO Control Measure	CSO Outfalls	12-Month Monitoring Data		Typical Year Performance			Overflow Frequency Performance Criteria Achieved (Yes / No)	Percent Capture Performance Criteria Achieved (Yes / No)	Comments
			CSO Volume (MG)	Overflow Frequency by Watershed	CSO Volume (MG)	Overflow Frequency by Watershed	Percent Capture (%)			
Upper White River	Riviera Club Improvements to Overflow Storage Tank Includes CSO Control Measures # 3, 13, 14	155, 205								
Fall Creek	Fall Creek Tunnel, Collector Pipes and Watershed Projects Includes CSO Control Measures # 2, 15	210, 049, 050, 050A, 051, 052, 053, 131, 054, 055, 132, 057, 058, 059, 060, 061, 213, 062, 063, 63A, 064, 065, 066, 142, 141, 135, 216, 103								
Lower Pogues Run	Lower Pogues Run Improvements Includes CSO Control Measures # 8, 18	115, 125, 128, 153, 129, 138, A38, 133, 137, 152, 136, 034, 34A, 035								
Lower White River	White River Tunnel (Central Tunnel and Pump Station) and Watershed Projects Includes CSO Control Measures # 1, 4, 6, 7, 9, 10, 11, 16, 17, 20, 21, 22, 23, 24, 25, 26, 27, 28	003, 008, 012, 013, 118, 117, 116, 037, 038, 039, 040, 147, 041, 042, 043, 044, 045, 046, 217, 218, 235, 275								
Pleasant Run and Bean Creek	Pleasant Run Overflow Collector Pipe (CSO Collector Pipe) Includes CSO Control Measures # 4, 29	120, 019, 020, 148, 021, 130, 149, 150, 022, 119, 151, 023, 025, 027, 127, 028, 029, 030, 106, 031, 109, 108, 107, 072, 073, 074, 075, 076, 077, 078, 080, 081, 224, 083, 154, 084, 085, 086, 227, 087, 088, 228, 229, 089, 089A, 090, 091, 092, 015, 016, 017								
Eagle Creek	Eagle Creek Overflow Collector Pipe (CSO Collector Pipe and Belmont West Cutoff) Includes CSO Control Measure # 30	145, 011, 032, 223, 033								
Upper Pogues Run	Upper Pogues Run Improvements Includes CSO Control Measures # 5, # 19, #31	036, 095, 096, 097, 098, 099, 100, 101, 102, 143								

[1] CSO Control Measures are listed in LTCP Table 7-5 along with Achievement of Full Operation (AFO) dates.
[2] Monitoring Schedule: Monitoring will be conducted, upon completion of construction, for a series of rainfall events, until the later of (a) 12 months or (b) a sufficient number of rainfall events consistent with design criteria have occurred so that sufficient sampling data has been obtained.
[3] Typical year performance criteria of 97 percent capture and and 2 overflow events (for Fall Creek) or 95 percent capture and 4 overflow events (all other CSO receiving waters) is based on average annual statistics over a representative five-year simulation period using the collection system model. "Typical year" performance shall be assessed based upon the average annual statistics generated for the representative five year simulation period of 1996 to 2000 (or another five year simulation period agreed to by the city, IDEM and U.S. EPA) using the collection system model.
[4] Milestone reports on the achievement of performance criteria will be prepared for each watershed, as described in Section 8.6.1.

completion of the Lower White River watershed to fully achieve their performance criteria. For this reason, monitoring data will be collected for the Lower Pogues Run and Eagle Creek watersheds after Achievement of Full Operation in both the Lower White River and the tributary watershed (i.e., Lower Pogues Run or Eagle Creek).

8.2.2 Water Quality Measures

Water Quality Measures are those used to assess the impacts of residual overflows that occur as well as improvements in water quality of receiving streams due to implementation of CSO control measures. The city will use as its water quality measures dissolved oxygen and *E. coli* bacteria (or other pathogen indicator, to the extent applicable water quality standards have been revised to include a different applicable pathogen indicator). In discussions with the regulatory agencies during the development of the LTCP, these parameters were identified as the parameters of concern.

Dissolved Oxygen (DO): The city will collect data to confirm that the approved LTCP is adequate to ensure that the residual CSOs do not cause or contribute to the violation of Indiana's instream DO standard of 4 mg/L minimum and 5 mg/L average per day.

E. coli Bacteria: The city will collect data to measure and evaluate improvements to instream *E. coli* bacteria counts that can be attributed to CSO control measures. It is unlikely that CSO controls alone will result in attainment of Indiana's *E. coli* standards for primary contact recreation due to numerous *E. coli* sources in the environment. Therefore, there are no numeric targets for *E. coli* as a water quality measure. Rather, the city will analyze trends in both dry weather and wet-weather *E. coli* values and compare them to historic monitoring data and modeling predictions to determine improvement in water quality and to ensure that residual CSO discharges do not interfere with applicable recreational uses. A different pathogen indicator other than *E. coli* may be requested by IDEM in accordance with this paragraph to the extent the applicable water quality standards are revised to include a different pathogen indicator.

8.3 Post-Construction Monitoring and Data Collection

8.3.1 Monitoring Schedule

The post-construction monitoring schedule, shown in Table 8-1, will be integrated with the city's current monitoring programs, as described below.

8.3.2 Monitoring Stations

Starting with a list of existing city monitoring locations, the city identified stations that would collect data needed to document stream improvements attributed to the implementation of CSO control measures. Monitoring sites also were chosen to allow assessment of various water quality improvement programs, such as the Stormwater Program, AWT Plant NPDES Permit Program and the development of the Total Maximum Daily Load. The city's monitoring program comprehensively assesses the measurable improvements in water quality of the receiving streams.

The city used the following criteria to select monitoring locations:

- Ability of monitoring stations to measure effectiveness of planned CSO control measures
- Proximity of receiving stream monitoring points to planned CSO control measures
- Ability to keep monitoring stations at the same locations used to establish baseline conditions (to aid in proper comparison of water quality results)
- Ability of monitoring stations to represent watershed characteristics and evaluate multiple factors, including land use, point sources, non-point sources, industrial sources, and so on
- Ability of monitoring stations to equally represent the different watersheds within the city for each station type
- Selection of major CSO outfalls for monitoring purposes to document measurable CSO reduction as a result of the controls (discharge volume, hydraulic control points, geographical area, and so on)
- Ability of monitoring stations to integrate and assess effectiveness of the city's multiple monitoring programs
- Site accessibility and local site conditions

The city uses a network of real-time and/or continuous monitoring stations to measure the following parameters:

streamflow and water stage, continuous DO, water temperature, treatment plant effluent discharge, CSO activation and CSO flow. The city gathers water quality data at 29 locations on CSO receiving streams. Eight locations have real-time, continuous monitoring for DO, pH, temperature and specific conductivity. The city also conducts monthly sampling at 23 sites on CSO receiving streams (including two of the continuous monitoring sites mentioned above). The monthly sampling program collects data on several parameters, including DO, pH, temperature, specific conductivity, flow, water appearance, *E. coli* and weather conditions at the time of sampling. As explained in Section 8.1, much of this monitoring is unrelated to the CSO post-construction monitoring program requirements, and therefore, is conducted at the city's discretion. CSO activation data is required by the city's NPDES permit and reported monthly by the city.

Current monitoring station locations within Marion County, together with the reasons for their selection, monitoring equipment types, monitoring frequencies, and monitoring parameters are presented in Table 8-2. Current locations of receiving stream monitoring stations and CSO outfall stations are shown in Figure 8-1 and Figure 8-2, respectively. Existing rainfall monitoring stations, located throughout Marion County, also are shown in Figure 8-2. Receiving stream monitoring will be required in each watershed as described in Table 8-1 following the Achievement of Full Operation of CSO Control Measures. The city may continue its in-stream monitoring program during other time periods. The city may add, modify, remove or relocate monitoring stations, as necessary, during or after implementation of CSO control measures to address any changes that may be necessary as a result of facility planning, design and construction, provided that the city notifies U.S.EPA and IDEM of such changes and any such changes are consistent with, and will allow for achievement of, the purpose and scope of this program set forth in Section 8.1.2.

8.3.3 Stream Monitoring

This task will include monitoring flow in receiving streams. United States Geological Survey (USGS) currently operates and maintains 15 real-time stream gauging stations in Marion County, three of which are on streams that do not receive CSO discharges. Of the remaining 12 stations, 10 are real-time streamflow discharge and water stage gauging stations and two are real-time water stage only gauging stations. Many gauging stations are managed together by USGS and the city through a cooperative agreement. Standard USGS equipment, procedures, and protocols will be used for long-term stream monitoring.

The DPW Office of Environmental Services (OES) currently operates two surface water quality programs in the White River and its tributaries. The first program involves the monthly monitoring of streams for various parameters, one of which includes visual observations of water depths at the 23 monitoring stations on CSO receiving streams to estimate streamflow. Monitoring locations and parameters are shown in Table 8-2 and Figure 8-1. The second OES program monitors dissolved oxygen in 15 minute intervals, 24 hours a day at the eight continuous monitoring locations in and around Marion County during the months of April/May through November/December. DO monitoring locations are shown in Figure 8-1. Current OES programs are integrated into the post-construction monitoring program.

In the event streamflow monitoring is discontinued by USGS at some locations, adequate historic data is available to estimate streamflow discharge using manual water depth measurements.

8.3.4 CSO Outfall Monitoring

Data collected through CSO outfall monitoring will evaluate whether the Performance Criteria are being achieved after implementation of the planned CSO control measures.

The Belmont AWT Plant NPDES Permit requires the city to monitor 19 CSO outfalls throughout the city. The city monitors onset, duration, and overflow volume at these CSOs with continuously recording flow meters (depth/velocity flow meters). The city will continue to monitor these CSOs using current or updated outfall monitoring procedures and equipment. The city will maintain field logs documenting installation activities, calibration methods, field truthing equipment and maintenance, and data downloads.

The city will monitor remaining outfalls using the CSO activation monitoring system. Rainfall monitoring will occur for each storm event during the post construction monitoring period to record each storm event using the city's current program (rain gauges and the radar rainfall system). Selected storm events will be used for analysis. See Section 8.3.7 for the details of the rainfall monitoring.

Table 8-2
CSO and Stream Monitoring[1]

Site ID	Location	Receiving Stream	Rationale	Real-time water quality	Real-time discharge	Intermittent water quality	Monitoring Frequency	Monitoring Protocols
1	82nd & WR	WR	Located upstream of the combined sewer service area at the north end of Marion County, representing the White River water quality without any effects of the Indianapolis CSO pollutants. Helps to evaluate the loads and flows into Indianapolis from the upstream basins, including Hamilton County			X	Monthly	DO, pH, Temp, SpC, Wthr, Q, Wa, *E. coli*
2	Morris St & WR	WR	Located downstream of the Fall Creek and Pogues Run watersheds to evaluate the cumulative effectiveness of the CSO control measures in these watersheds on the White River water quality			X	Monthly	DO, pH, Temp, SpC, Wthr, Q, Wa, *E. coli*
3	Harding St & WR	WR	Located upstream of the Belmont AWT plant to evaluate the cumulative effectiveness of the CSO control measures in the Fall Creek, Pogues Run, Pleasant Run and White River watersheds			X	Monthly	DO, pH, Temp, SpC, Wthr, Q, Wa, *E. coli*
4	Tibbs-Banta Landfill & WR	WR	Located upstream of the Southport AWT plant to evaluate the cumulative effectiveness of the CSO control measures in the Fall Creek, Pogues Run, Pleasant Run and White River watersheds and the Belmont AWT plant improvements			X	Monthly	DO, pH, Temp, SpC, Wthr, Q, Wa, *E. coli*
5	Southwestway Park & WR	WR	Located downstream of the Southport AWT plant to evaluate the cumulative effectiveness of the CSO control measures in the Fall Creek, Pogues Run, Pleasant Run, Eagle Creek and White River watersheds and Belmont and Southport AWT plant improvements			X	Monthly	DO, pH, Temp, SpC, Wthr, Q, Wa, *E. coli*
6	Waverly & WR	WR	Located downstream in Morgan County to evaluate the cumulative effectiveness of the all CSO control measures in the City of Indianapolis, Marion County	X		X	Monthly/ Continuous	Monthly: DO, pH, Temp, SpC, Wthr, Q, Wa, *E. coli* Real Time: Continuous DO, pH, Temp, SpC
7	Meridian St & PI R	PI R	Located to evaluate the cumulative effectiveness of the CSO control measures in the Pleasant Run and Bean Creek watersheds before confluence with White River	X		X	Monthly/ Continuous	Monthly: DO, pH, Temp, SpC, Wthr, Q, Wa, *E. coli* Real Time: Continuous DO, pH, Temp, SpC

Table 8-2 (continued)
CSO and Stream Monitoring [1]

Site ID	Location	Receiving Stream	Rationale	Real-time water quality	Real-time discharge	Intermittent water quality	Monitoring Frequency	Monitoring Protocols
8	New York St & Po R	Po R	Located to evaluate the cumulative effectiveness of the CSO control measures in the upper Pogues Run (Spades Park Facility) before entering the existing box culvert			X	Monthly	DO, pH, Temp, SpC, Wthr, Q, Wa, *E. coli*
9	Garfield Park & BC	BC	Located to evaluate the effectiveness of the CSO control facility in the Bean Creek watershed before confluence with Pleasant Run			X	Monthly	DO, pH, Temp, SpC, Wthr, Q, Wa, *E. coli*
10	16th St & FC	FC	Located to evaluate the effectiveness of the CSO control measures in the Fall Creek watershed before confluence with White River			X	Monthly	DO, pH, Temp, SpC, Wthr, Q, Wa, *E. coli*
11	Raymond St & BEC	BEC	Located to evaluate the effectiveness of the CSO control measures in the Eagle Creek watershed before confluence with White River			X	Monthly	DO, pH, Temp, SpC, Wthr, Q, Wa, *E. coli*
12	96th St & WC	WC	Located upstream of the combined sewer service area at the north end of Marion County, representing the Williams Creek water quality before entering into Indianapolis. Helps to evaluate the loads and flows into Indianapolis from the upstream basins, including Hamilton County			X	Monthly	DO, pH, Temp, SpC, Wthr, Q, Wa, *E. coli*
13	16th St & PI R	PI R	Located upstream of the combined sewer service area, representing the Pleasant Run water quality without any effects of the CSOs			X	Monthly	DO, pH, Temp, SpC, Wthr, Q, Wa, *E. coli*
14	21st St & Po R	Po R	Located upstream of the combined sewer service area, representing the Pogues Run water quality without any effects of the CSOs			X	Monthly	DO, pH, Temp, SpC, Wthr, Q, Wa, *E. coli*
15	Southern Ave & BC	BC	Located to evaluate the cumulative flows and loads from Bean Creek before confluence with Pleasant Run			X	Monthly	DO, pH, Temp, SpC, Wthr, Q, Wa, *E. coli*
16	71st St & FC	FC	Located upstream of the combined sewer service area, representing the Fall Creek water quality without any effects of the CSOs			X	Monthly	DO, pH, Temp, SpC, Wthr, Q, Wa, *E. coli*
17	Dandy Trail & BEC	BEC	Located upstream of the combined sewer service area, representing the Eagle Creek water quality without any effects of the CSOs			X	Monthly	DO, pH, Temp, SpC, Wthr, Q, Wa, *E. coli*
21	IPL & WR	WR	Area of historic low DO concern in White River	X			Continuous	Real-Time: Continuous DO, pH, Temp, SpC

Table 8-2 (continued)
CSO and Stream Monitoring[1]

Site ID	Location	Receiving Stream	Rationale	Real-time water quality	Real-time discharge	Intermittent water quality	Monitoring Frequency	Monitoring Protocols
22	Emerson Way & FC	FC	Located upstream of combined sewer service area, representing the Fall Creek water quality without any effects of the CSOs			X	Monthly	DO, pH, Temp, SpC, Wthr, Q, Wa, *E. coli*
32	Harding St & LC	LC	Located just upstream of confluence with White River, representing the Lick Creek water quality			X	Monthly	DO, pH, Temp, SpC, Wthr, Q, Wa, *E. coli*
43	30th St & WR	WR	Located upstream of the combined sewer service area, representing the White River water quality without any effects of the CSOs (except the proposed Riviera Club Storage/Treatment Facility in Upper White River watershed)			X	Monthly	*E. coli*
46	Brookside Park & Po R	Po R	To evaluate the effectiveness of the Pogues Run CSO Reduction and Flood Control Project-Brookside Park Detention Basin			X	Monthly	*E. coli*
47	Emerson Ave & Po R	Po R	To evaluate the effectiveness of the Pogues Run CSO Reduction and Flood Control Project-Emerson Avenue Detention Basin			X	Monthly	DO, pH, Temp, SpC, Wthr, Q, Wa, *E. coli*
49	10th St & LEC	LEC	Located upstream of the combined sewer service area, representing the Little Eagle Creek water quality without any effects to the CSOs.			X	Monthly	DO, pH, Temp, SpC, Wthr, Q, Wa, *E. coli*
81	Boulevard Pl & FC	FC	Area of historic low DO concern in Fall Creek	X			Continuous	Real-Time: Continuous DO, pH, Temp, SpC
82	16th St & WR	WR	Above area of historic low DO concern/majority of CSOs in White River	X			Continuous	Real-Time: Continuous DO, pH, Temp, SpC
85	Old Washington St & WR	WR	Area of historic low DO concern in White River	X			Continuous	Real-Time: Continuous DO, pH, Temp, SpC
86	Keystone Ave & WR	WR	Located upstream of the combined sewer service area at the north end of Marion County, representing DO conditions in White River without any effects of the Indianapolis CSOs	X			Continuous	Real-Time: Continuous DO, pH, Temp, SpC
103	Keystone Ave & FC	FC	Located upstream of combined sewer service area, representing DO conditions in Fall Creek without any effects of the CSOs	X			Continuous	Real-Time: Continuous DO, pH, Temp, SpC
USGS-1	Nora & WR	WR	USGS Gaging Station #03351000		X		Continuous	River Flow, Water Stage
USGS-2	Broad Ripple & WR	WR	USGS Gaging Station #03351060		X		Continuous	Water Stage Only
USGS-3	Michigan St & WR	WR	USGS Gaging Station #03352750		X		Continuous	River Flow, Water Stage
USGS-4	Morris St & WR, River Mile 230.3 (2.6 miles downstream of FC, 3.4 miles upstream of BEC, and 4.0 miles upstream of IPL Dam)	WR	USGS Gaging Station #03353000 (White River at Indianapolis)		X		Continuous	River Flow, Water Stage

Table 8-2 (continued)
CSO and Stream Monitoring[1]

Site ID	Location	Receiving Stream	Rationale	Real-time water quality	Real-time discharge	Intermittent water quality	Monitoring Frequency	Monitoring Protocols
USGS-5	Stout Dam & WR (downstream of Belmont AWT Plan)	WR	USGS Gaging Station #03353611	X	X		Continuous	River Flow, Water Stage, Water Temperature
USGS-6	Millersville Rd & FC, River Mile 9.2	FC	USGS Gaging Station #03352500		X		Continuous	Stream Flow, Water Stage
USGS-7	Above Eagle Creek Reservoir Dam at BEC	BEC	USGS Gaging Station #03353450		X		Continuous	Water Stage Only
USGS-8	Below Eagle Creek Reservoir Dam at BEC	BEC	USGS Gaging Station #03353451		X		Continuous	Stream Flow, Water Stage (Partial Record Site)
USGS-9	Lynhurst Dr & BEC, River Mile 7.9	BEC	USGS Gaging Station #03353500		X		Continuous	Stream Flow, Water Stage
USGS-10	Little Eagle Creek at Speedway, IN	LEC	USGS Gaging Station #03353600		X		Continuous	Stream Flow, Water Stage
USGS-11	Pleasant Run at Arlington Avenue	PI R	USGS Gaging Station #03353120		X		Continuous	Stream Flow, Water Stage
USGS-12	Lick Creek at Keystone Ave.	LC	USGS Gaging Station #03353620		X		Continuous	Stream Flow, Water Stage
CSO 003	Southport AWT Plant	WR	Monitoring required per NPDES permits		X		Continuous	Flow, Level, Velocity (onset, duration, and volume of overflow)
CSO 008	Belmont AWT Plant	WR	Monitoring required per NPDES permits		X		Continuous	Flow, Level, Velocity (onset, duration, and volume of overflow)
CSO 016	Shelby St & Willow Dr	PI R via BC	Located in the city's Garfield Park. Monitoring also required per NPDES permits		X		Continuous	Flow, Level, Velocity (onset, duration, and volume of overflow)
CSO 039	New York St & Beauty Ave	WR	Significant CSO point in White River watershed. Monitoring required per NPDES permits		X		Continuous	Flow, Level, Velocity (onset, duration, and volume of overflow)
CSO 042	Saint Clair St & Lynn Ave	WR	Significant CSO point in White River watershed. Monitoring required per NPDES permits		X		Continuous	Flow, Level, Velocity (onset, duration, and volume of overflow)
CSO 045	WRPWD & Belmont Ave	WR	Significant CSO point in White River watershed. Monitoring required per NPDES permits		X		Continuous	Flow, Level, Velocity (onset, duration, and volume of overflow)

Table 8-2 (continued)
CSO and Stream Monitoring[1]

Site ID	Location	Receiving Stream	Rationale	Real-time water quality	Real-time discharge	Intermittent water quality	Monitoring Frequency	Monitoring Protocols
CSO 051	Capitol Ave & 22nd St	FC	Significant CSO point in Fall Creek watershed. Monitoring also required per NPDES permits		X		Continuous	Flow, Level, Velocity (onset, duration, and volume of overflow)
CSO 053	FCPND & Illinois St	FC	Monitoring required per NPDES permits		X		Continuous	Flow, Level, Velocity (onset, duration, and volume of overflow)
CSO 055	28th St & Talbot St	FC	Monitoring required per NPDES permits		X		Continuous	Flow, Level, Velocity (onset, duration, and volume of overflow)
CSO 065	Sutherland Ave & 34th St	FC	Significant CSO point in Fall Creek watershed. Monitoring required per NPDES permits		X		Continuous	Flow, Level, Velocity (onset, duration, and volume of overflow)
CSO 066	Fall Creek Blvd & Balsam Ave	FC	Monitoring required per NPDES permits		X		Continuous	Flow, Level, Velocity (onset, duration, and volume of overflow)
CSO 084	PLRPND & Michigan St	Pl R	Significant CSO point in Pleasant Run watershed. Monitoring also required per NPDES permits		X		Continuous	Flow, Level, Velocity (onset, duration, and volume of overflow)
CSO 100	BPSD & Rural St	Po R	Significant CSO point in Pogues Run watershed. Monitoring required per NPDES permits		X		Continuous	Flow, Level, Velocity (onset, duration, and volume of overflow)
CSO 101	Sherman Dr & BPND	Po R	Significant CSO point in Pogues Run watershed. Monitoring required per NPDES permits		X		Continuous	Flow, Level, Velocity (onset, duration, and volume of overflow)
CSO 108	PLRPSD & Saint Paul St	Pl R	Monitoring required per NPDES permits		X		Continuous	Flow, Level, Velocity (onset, duration, and volume of overflow)
CSO 117	Southern Ave & White River	WR	Significant CSO point in White River watershed. Monitoring required per NPDES permits		X		Continuous	Flow, Level, Velocity (onset, duration, and volume of overflow)
CSO 118	WRPED & West St	WR	Significant CSO point in White River watershed. Monitoring required per NPDES permits		X		Continuous	Flow, Level, Velocity (onset, duration, and volume of overflow)
CSO 125	Meridian St & South St	Po R	Significant CSO point in Pogues Run watershed. Monitoring required per NPDES permits		X		Continuous	Flow, Level, Velocity (onset, duration, and volume of overflow)
CSO 145	Old Raymond & Belmont	BEC	Monitoring required per NPDES permits		X		Continuous	Flow, Level, Velocity (onset, duration, and volume of overflow)
CSOs 012, 013, 116, 115, 037, 038, 040, 147, 041, 042, 043, 044, 045, 155, 205	Various Locations - White River Watershed	WR	Monitoring of CSO activation of all remaining CSOs in White River watershed		X		Continuous	CSO Activation Monitoring

Table 8-2 (continued)
CSO and Stream Monitoring[1]

Site ID	Location	Receiving Stream	Rationale	Real-time water quality	Real-time discharge	Intermittent water quality	Monitoring Frequency	Monitoring Protocols
CSOs 210, 049, 050, 050A, 052, 131, 054, 132, 057, 058, 059, 060, 061, 213, 062, 063, 63A, 064, 142, 141, 135, 216	Various Locations - Fall Creek Watershed	FC	Monitoring of CSO activation of all remaining CSOs in Fall Creek watershed		X		Continuous	CSO Activation Monitoring
CSOs 128, 153, 129, 138, A38, 133, 137, 152, 136, 034, 34A, 035, 036, 095, 096, 097, 098, 099, 102	Various Locations - Pogues Run Watershed	Po R	Monitoring of CSO activation of all remaining CSOs in Pogues Run watershed		X		Continuous	CSO Activation Monitoring
CSOs 120, 019, 020, 148, 021, 130, 149, 150, 022, 119, 151, 023, 025, 027, 127, 028, 029, 030, 106, 031, 109, 108, 072, 073, 074, 075, 076, 077, 078, 080, 081, 224, 083, 154, 084, 085, 086, 227, 087, 088, 228, 229, 089, 089A, 090, 091, 092	Various Locations - Pleasant Run Watershed	Pl R	Monitoring of CSO activation of all remaining CSOs in Pleasant Run watershed		X		Continuous	CSO Activation Monitoring
CSOs 015	Various Locations - Bean Creek Watershed	BC	Monitoring of CSO activation of remaining CSO in Bean Creek watershed		X		Continuous	CSO Activation Monitoring

Table 8-2 (continued)
CSO and Stream Monitoring[1]

Site ID	Location	Receiving Stream	Rationale	Real-time water quality	Real-time discharge	Intermittent water quality	Monitoring Frequency	Monitoring Protocols
CSOs 011, 032, 223, 033	Various Locations - Eagle Creek Watershed	BEC	Monitoring of CSO activation of all remaining CSOs in Eagle Creek watershed		X		Continuous	CSO Activation Monitoring
Outfall 001	Southport AWT Plant	WR	Monitoring of final effluent, after receiving AWT treatment at Southport AWT Plant. Monitoring required per NPDES Permit		X		Daily/ Continuous	Flow (24 hour total)
						X	Daily	pH, *E. coli*, DO (Grab 12/24 hour)
Outfall 006	Belmont AWT Plant	WR	Monitoring of final effluent, after receiving AWT treatment at Belmont AWT Plant. Monitoring required per NPDES Permit		X		Daily/ Continuous	Flow (24 hour total)
						X	Daily	pH, *E. coli*, DO (Grab 12/24 hour)
Outfall 005 (New)	Belmont AWT Plant	WR	Monitoring of effluent, after receiving wet weather secondary treatment at Belmont AWT Plant					Monitoring to be performed as required through the 2006 modification to the Belmont NPDES permit

LEGEND

River/Tributary Abbreviations:

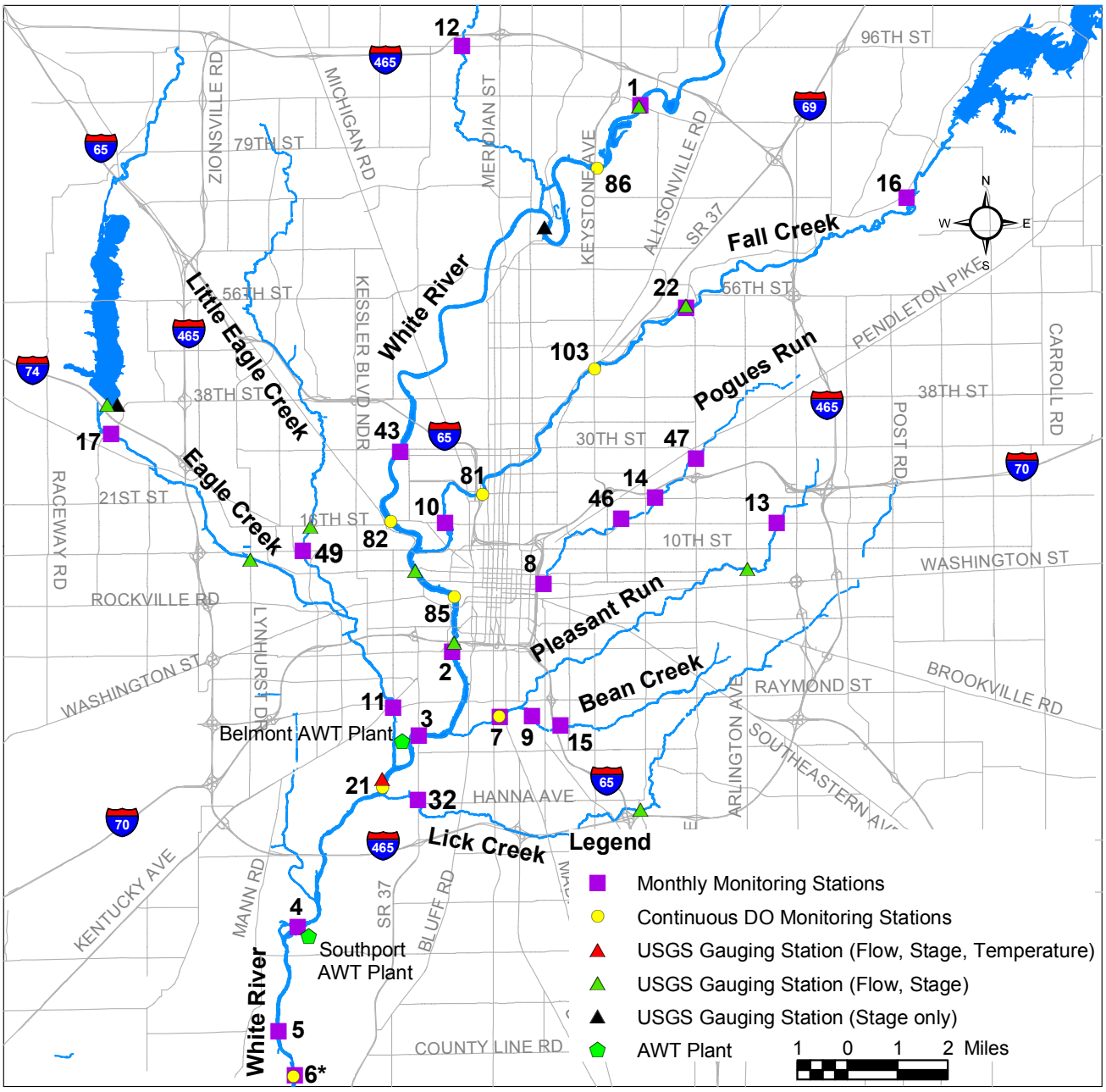
BC	Bean Creek
BEC	Big Eagle Creek
FC	Fall Creek
LC	Lick Creek
LEC	Little Eagle Creek
Pl R	Pleasant Run
Po R	Pogues Run
WC	Williams Creek
WR	White River

Analytical Parameter Abbreviations:

Parameter[1]	Symbol
Dissolved Oxygen	DO
pH	pH
Temperature	Temp[2]
Specific Conductivity	SpC
Weather	Wthr[3,4]
Flow	Q[5]
Water Appearance	Wa[6]
E. coli	*E. coli*

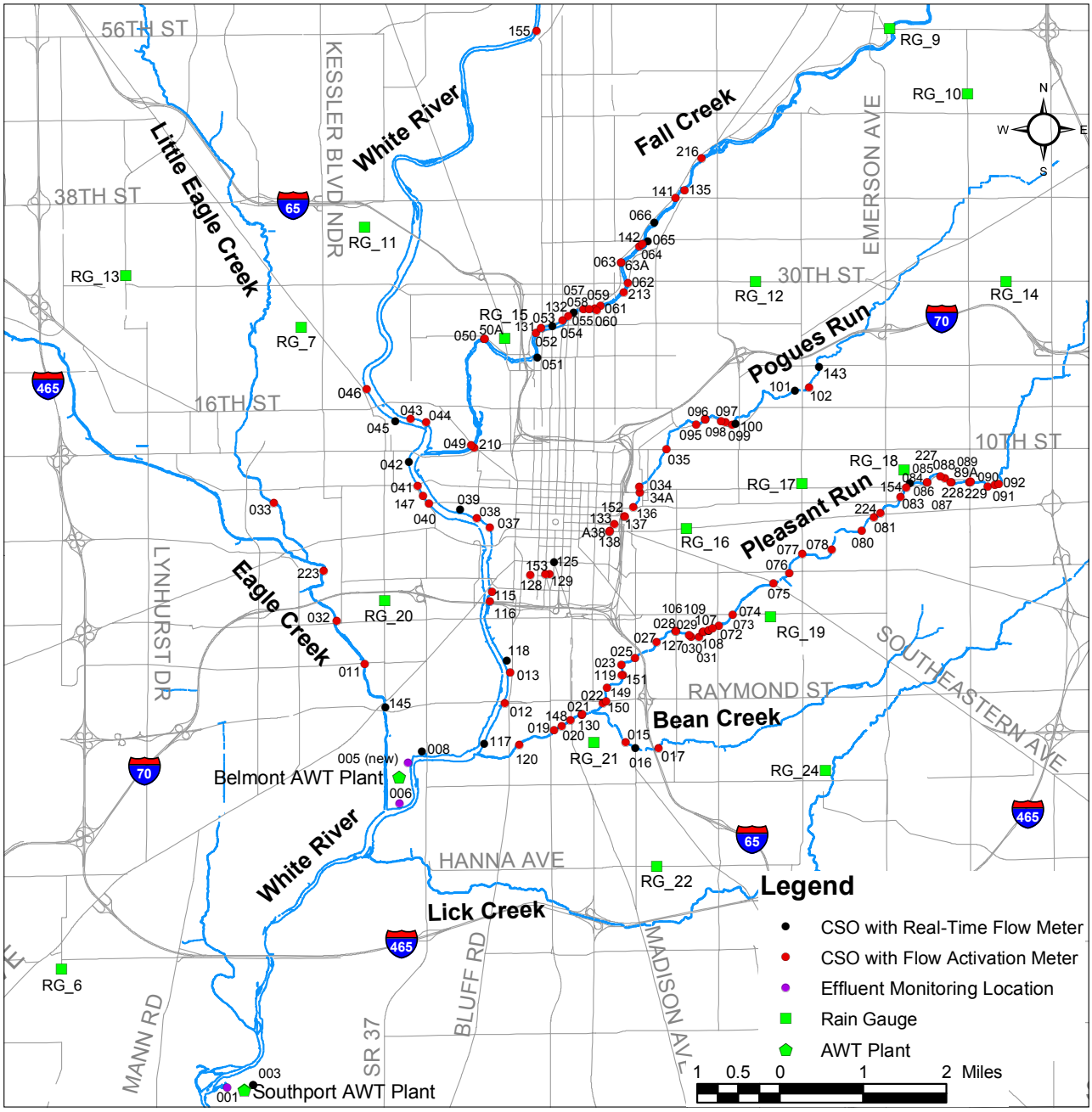
(Footnotes)

[1] The following monitoring protocols are optional: ph, SpC, flow (Q), water appearance, weather conditions and other weather comments.
[2] Approximate Air Temp, Code: 0=No Data, 1=Hot, >80 deg F, 2=Warm, 60-79 deg F, 3=Cool, 40-59 deg F, 4=Cold, 20-39 deg F, 5=Very Cold, <20 deg F
[3] Weather Conditions, Code: 0=No Data, 1=Clear/Sunny, 2=Ptly Sunny/Ptly Cloudy/Fair, 3=Cloudy, 4=Lt Rain, 5=Rain, 6=Lt Snow, 7=Snow
[4] Other Weather Comments, Code: 1=Windy, 2=Humid/Muggy
[5] Flow (Q): 1=Low, 2=Moderate, 3=High
[6] Water Appearance (Wa): 1=Clear, 2=Cloudy, 3=Murky, 4=Muddy



Note: *The monthly monitoring station 6 on White River is about nine river-miles downstream of the Marion/Johnson County border near Waverly, Indiana. Monitoring stations shown are general locations.

Figure 8-1
Receiving Stream Monitoring Stations



Note: Monitoring stations shown are general locations.

Figure 8-2
CSO Outfall and Rainfall Monitoring Stations

8.3.5 Water Quality Monitoring

The city's ongoing water quality monitoring program will be useful to evaluate the effects of CSO control measures. The USGS currently has one real-time stream water temperature monitoring stations. USGS is expected to continue to monitor water temperature at this site. In addition to the monitoring required under this Post-Construction Monitoring Program necessary to evaluate the impacts of CSOs on dissolved oxygen and *E. coli* (or other pathogens) levels in the CSO-impacted receiving streams, OES will continue, at the city's discretion, its current voluntary programs of monthly water quality monitoring. The city will follow standard data collection, quality control and laboratory analysis protocols and procedures, including the components listed below.

Sample and Field Data Collection Procedures:

Pre Sampling Procedures:

- Select personnel and identify responsibilities
- Train personnel in safety and confined space entry; verify first aid and wet-weather training, CPR, currency of vaccinations, and so on)
- Prepare site access and obtain legal consents
- Acquire necessary scientific sampling or collecting permits
- Develop formats for field sampling logs and diaries
- Train personnel in pre sampling procedures (purging supply lines, instrument calibration)
- Check equipment availability, acquisition, and maintenance
- Schedule sample collection
- Prepare pre-sampling checklist

Sampling Procedures:

- Prepare document for sampling procedures
- Evaluate staff qualifications and provide training
- Establish sampling protocols
- Establish quality control procedures (equipment checks, replicates, splits, and so on)
- Collect samples in required sample containers
- Label sample containers identifying sample number, date, time, location, and so on
- Preserve samples per required procedures (for example, "on ice" or chemical preservatives)
- Obtain field measurements for streamflow discharge
- Collect samples and perform field tests for DO, temperature, pH, and conductivity
- Complete field logs and diary entries including sampling dates, times, sample identification number, equipment calibration, monitoring results, weather conditions, and other pertinent observations in support of sample collection
- Follow sample storage and transport requirements and deliver samples to laboratory
- Complete sample tracking and chain-of-custody reports and audit reports
- Perform quality control and quality assurance

Post Sampling Follow Up:

- File sample logs and diaries
- Clean and maintain equipment
- Handle and dispose of chemical wastes properly
- Review documentation and audit reports

Laboratory Analysis:

Preparation Prior to Sample Analysis:

- Verify use of proper analytical methods
- Schedule analyses
- Verify sample numbers
- Define a recording system for sample results
- Apply a system to check each sample through the lab
- Maintain and calibrate equipment
- Prepare quality control solutions

Sample Analysis:

- Analyze samples using appropriate methods and protocols
- Validate use of reference samples, duplicates, blanks, etc.
- Perform quality control and quality assurance compliance
- Archive samples
- Handle and properly disposal of chemical wastes
- Prepare bench sheets and complete analysis reports

Data Record Verification:

- Review coding sheets, data loggers
- Review and refine data verification procedures and compliance with project plan
- Verify analysis of splits within data quality objectives
- Assign data quality indicators and explanations

8.3.6 AWT Plant Effluent Monitoring

The city will monitor three effluent locations using pollutant sampling and discharge equipment so that the data collected can be used to satisfy multiple monitoring objectives. Of these three stations, two will be at the Belmont AWT plant and one will be at the Southport AWT plant.

Existing final effluent locations at Belmont (Outfall 006) and Southport (Outfall 001) AWT plants will be monitored as required under applicable NPDES permits. An additional effluent location at the Belmont plant (outfall 005) will be monitored as required through the 2006 wet-weather modification to the Belmont NPDES permit.

8.3.7 Rainfall Monitoring

The city has 25 rain gauge monitoring stations across the CSO service area. During validation of the CSO system model, the city demonstrated that the existing rain gauge network provided sufficient data. As such, the city will continue to monitor rainfall using rain gauge stations. Rainfall monitoring will occur for each storm event during the post-construction monitoring period to record each storm event. The 25-gauge network and the radar rainfall system will be used to characterize rainfall in each sub-basin.

8.4 Data Retrieval, Management and Analysis

Data retrieval, management and analysis are an integral part of any monitoring program. The city currently has a system to store, retrieve, and analyze the existing data. This post-construction monitoring program was developed to use the existing database and to evaluate new data to measure effectiveness of CSO control measures utilizing current modeling tools. The program activities are designed to ensure collection of appropriate data, establish consistency of sampling methods and data acquisition, and define performance standards for maintaining data integrity. All necessary measures will be taken to validate, track, store and manage the collected data to ensure that monitoring objectives are attained.

Specific sampling protocols are administered and conducted by experienced personnel responsible for the existing database and model and familiar with sampling protocols in support of the ongoing monitoring program for the City of Indianapolis. As data are generated during post-construction monitoring, the program may need to be revised to accommodate alternative data collection techniques or data evaluation approaches to meet monitoring objectives. Any revisions or additions to the data retrevial or management aspects of such program will be made after consulting with IDEM and U.S. EPA.

The City has developed a dynamic model that fully integrates the hydrology and hydraulics of the combined sewer system (collection system model). The city will utilize sound engineering judgement and best industry practices, and take the following steps, to update and utilize the collection system model to determine whether the city has achieved compliance with the Performance Criteria set forth in Table 7-5.

1. Collect data for the 12-month post-construction monitoring period in each watershed in accordance with Section 8.2.1.

2. Perform quality assurance and quality control of the data collected in Step 1.

3. Utilize the Model in its previously-calibrated state and the rainfall data collected during the monitoring period, to run a continuous simulation of CSO discharges for the 12-month post-construction monitoring period.

4. Compare the continuous simulation outputs to the CSO monitoring data for the 12-month post-construction monitoring period to determine whether re-calibration of the collection system model is needed. Model re-calibration will be not be needed if the model achieves at least the same degree of calibration as was achieved for pre-CSO Long-Term Control conditions during the LTCP development process, and there is a high degree of agreement between the model output and CSO monitoring data for activation frequency for the 12-month post-construction monitoring period. Otherwise, model re-calibration will be needed in accordance with Steps 5-7.

5. If re-calibration is needed, select two or more appropriate rainfall events from the 12-month post-construction monitoring period for model recalibration.

6. Develop an initial data set for use with the model and perform successive applications of the model with appropriate parameter adjustment until there is a high degree of agreement between the model output and the CSO monitoring data for the 12-month post-construction monitoring period. In making such adjustments, the city will consider the inherent variability in both the collection system model and in flow monitoring data, and will exercise sound engineering judgement and best industry practices so as to not compromise the overall representativeness of the model.

7. Once the model has been re-calibrated in accordance with Step 6, the city will verify the re-calibrated model by again utilizing the model and the rainfall data collected during the 12-month post-construction monitoring period, to run another continuous simulation for the 12-month post-construction monitoring period. The city will again com-

pare the continuous simulation outputs to the CSO monitoring data for the 12-month post-construction monitoring period as described in Step 4, to determine whether additional re-calibration of the collection system model is needed. Re-calibration will be determined to be adequate if the model achieves at least the same degree of calibration, as was achieved for pre-CSO Long-Term Control conditions during the LTCP development process, and there is a high degree of agreement between the model output and CSO monitoring data for activation frequency for the 12-month post-construction monitoring period. Otherwise, further re-calibration will be needed in accordance with these Steps 5-7 until the model achieves at least the same degree of calibration as was achieved for pre-CSO Long-Term Control conditions during the LTCP development process, and there is a high degree of agreement between the model output and CSO monitoring data for activation frequency for the 12-month post-construction monitoring period.

8. Once the city has satisfactorily re-calibrated the model in accordance with Steps 5 through 7 (or shown that re-calibration is not necessary in accordance with Step 4), the city will then utilize the original or recalibrated model (if re-calibration was necessary in accordance with Steps 4-7) to run a continuous simulation for the years 1996-2000 (or other representative five-year period agreed to by IDEM and USEPA) to determine whether the city has achieved the Performance Criteria set forth in Table 7-5.

9. The city shall be deemed to have achieved the Performance Criteria if the five-year simulation shows 97% or greater capture on the Fall Creek watershed and 95% or greater capture on the White River, Pogues Run, Pleasant Run and Eagle Creek watersheds; and that there were a total of 12 or fewer CSO events into the Fall Creek watershed and 24 or fewer CSO events into each of the four remaining watersheds for the five-year period. Otherwise, the city shall be deemed to have not achieved the Performance Criteria until the city runs a continuous simulation for the years 1996-2000 (or other representative five-year period agreed to by IDEM and USEPA) with a satisfactorily calibrated or re-calibrated model that demonstrates that both the percent capture and overflow frequency Performance Criteria have been achieved.

10. The overflow frequency performance criterion is based upon a "typical year," calculated using the 5-year continuous simulation of the collection system model, as described above. The CSO Control Measures will be designed to achieve 2 CSO events per "typical" year for the Fall Creek watershed and 4 CSO events per "typical" year for each of the other four watersheds. If the modeled overflow frequency for the five-year period exceeds 12 for the Fall Creek watershed and/or 24 for the four remaining watersheds, then the city may submit an analysis that will include: (1) the volume, frequency and factors causing the additional overflow frequency, (2) any impact on water quality, including designated uses, from the additional overflow frequency, (3) control options, if any, to reduce the frequency toward 24/12 (as appropriate), (4) associated costs from any additional control options, (5) any expected benefits from such control options and (6) a recommendation as to whether additional control measures are necessary to protect designated uses.

11. The use of the five-year overflow occurrence numbers of 24 and 12, which equate to average annual overflow frequencies of 4.8 and 2.4, is appropriate due to the inherent 20 percent variability in model predictions.

One key performance criteria for the LTCP is percent capture. Percent capture is a U.S. EPA measure of the annual wet-weather sewage flow that is captured and treated before discharge. For example, "95 percent capture" means that the long-term control plan will capture 95 percent of the total volume of flow collected in the combined sewer system during wet-weather conditions on a system-wide, annual average basis (not 95 percent of the volume currently being discharged). On a system-wide basis, 95 percent capture is expected to equate to four storms causing overflow events in an average year. However, year-to-year variability in rainfall is such that some years may have more than four or less than four overflow events. The city wants to clearly inform people that "four overflow events per year" is a long-term average based upon typical rainfall, and not a calendar-year regulatory requirement. Based upon 54 years of historic rainfall data, some dry calendar years might have no storms causing overflow events while wet years would have as many as 10 overflow events for 95 percent capture and six overflow events for 97 percent capture. The predicted system performance for overflow frequency was shown previously in Figures 7-12 through 7-14. **Figure 8-3** illustrates how percent capture will be measured.

The city also plans to use its hydraulic models to evaluate the effectiveness of LTCP controls and to fine tune planning and implementation of specific CSO control projects. This will allow the city to determine how various scenarios might affect evolving management and control strategies along Indianapolis streams.

8.5 Quality Control

Quality control procedures are in place and may be updated periodically to ensure consistent delivery of quality work and products for all activities included under the post-construction monitoring program. The quality control procedures include the following:

- Documentation of receiving streamflow monitoring and field measurement activities. Assurances that flow data generated are valid and representative, including streamflow discharge estimates.
- Documentation of CSO outfall monitoring activities including installation activities, calibration records, field-truthing equipment and maintenance, and data

downloads. Assurances that flow data generated are valid and representative.

- Documentation of field sampling activities including sampling dates, times, sample identification numbers, equipment calibration, monitoring results, weather conditions, and any other pertinent observations in support of the sample collection. Completion of tracking forms, chain-of-custody forms and sampling equipment maintenance records.
- Documentation of laboratory analysis activities including sample checking, analytical methods and protocols, use of reference samples and duplicates, sample archiving, data verification and coding, equipment calibration and maintenance and data downloads.
- Documentation of rainfall monitoring activities including equipment calibration and maintenance records, precipitation records, and data downloads. Assurances that precipitation data generated are valid and representative.
- Documentation of data retrieval, management and analysis activities including data entry practices and data validation (e.g., entry range limits, duplicate entry checking), data tracking, data formatting, data analysis, and data reporting.
- Quality control reviews of all internal and external deliverables.

8.6 Data Evaluation and Progress Reporting

As noted earlier in Section 1, water quality in the White River basin is affected by sources other than combined sewer overflows. To ensure that public resources are spent responsibly, the long-term control plan is an integral part of a watershed-based strategy that considers all water pollution sources and the most cost-effective means of achieving water quality goals. The city is implementing several programs with a goal of improving water quality conditions, including the CSO long-term control plan, septic tank elimination program and stormwater management program. Implementation of these programs will result in measurable improvements to water quality.

The post-construction monitoring program will evaluate whether CSO controls are performing as designed and expected. It also will assess water quality conditions in CSO receiving streams to compare to baseline conditions described in Section 2. Because of the interconnected nature of the city's programs and waterways, water quality improvements may be attributable to more than one of the city's water quality improvement programs.

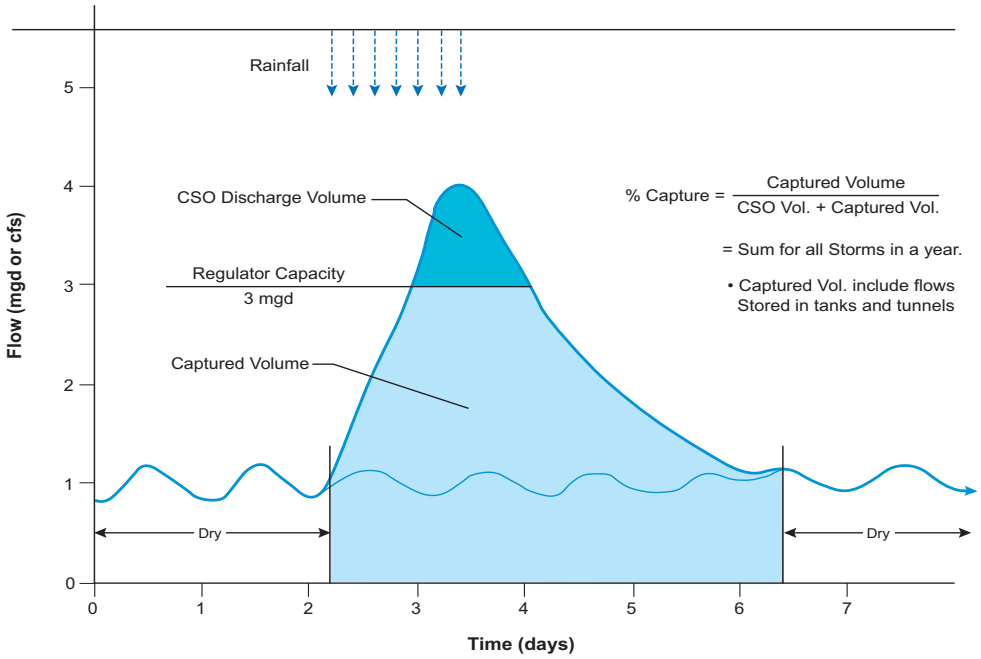


Figure 8-3
Sample Percent Capture Hydrograph

8.6.1 Milestone Reports

After Achievement of Full Operation of all LTCP projects in a specified watershed, the city will prepare and submit a report to the U.S. EPA and IDEM. The report for each watershed will be submitted within two years following Achievement of Full Operation of the applicable CSO project(s). The reports will include only the CSO measures implemented and data related to the following information:

- Description of stream section and CSO control being evaluated
- CSO Monitoring and Rainfall Monitoring Results
- Receiving Stream Monitoring Results
- Effluent Testing Results
- Water Quality Monitoring Results (including the extent to which the city's CSOs into that watershed are complying with water quality-based requirements of the city's NPDES permits)
- Evaluation of CSO Control Measures (including whether or not the measures meet the Performance Criteria specified in Table 7-5)
- Significant Variances and Impacting Factors (with regard to verification of level of control and water quality impacts)
- Re-Evaluation and Corrective Actions (if necessary)
- Status of CSO Control Measures (reporting on the status of construction schedule, and so on)

Within five years following Achievement of Full Operation of all LTCP projects, the city shall submit a final Post-Construction Monitoring Report to U.S. EPA and IDEM, containing the information described above with respect to each watershed, plus additional information relevant to those matters that Indianapolis is aware of that has become available subsequent to completion of the watershed reports. The purpose of the Final Post-Construction Monitoring Report shall be to document how well the city's entire combined sewer system is performing as a whole, following completion of all LTCP projects, and shall include an assessment of whether the improvements are meeting Performance Criteria, and whether the city's CSO discharges are complying with the water-quality based requirements of the city's NPDES permits.

The reports will identify deficiencies or performance limiting factors in system design, process, operations, and/or maintenance that may limit the overall effectiveness of the CSO control measures in achieving their intended performance. Necessary corrective measures will be documented. The city will evaluate alternative operating strategies for the implemented controls prior to considering structural modifications. If improvements or additional facilities and processes are needed to meet applicable requirements, the city will identify them in the report.

8.6.2 Progress Reports to Public

The city will prepare periodic public progress reports describing progress in the design, construction, and effectiveness of water quality improvement projects. These reports will be designed to provide information to Indianapolis residents on water quality improvements and the benefits gained by controlling CSOs, sewering unsewered areas, and implementing stormwater best management practices. The reports will be available on the city's Web site and to the news media, interested organizations, and in meetings with interested parties. The city also will continue its public notification and education program, which is described in Section 5.

8.7 Summary

The city's post-construction monitoring program will determine the effectiveness of the CSO control program in achieving performance requirements and water quality goals. The program includes the following elements:

- Activities to determine whether CSO control measures are meeting Performance Criteria;
- Measures to assess the environmental benefits attributable to CSO control measures and other water quality improvements, and to determine whether the city's CSO discharges are complying with the water quality-based requirements of the applicable NPDES permit;
- A monitoring schedule, monitoring locations, and associated monitoring procedures to collect data related to the Performance Criteria; and
- Evaluation and analysis of the monitoring data to determine whether CSO control measures are achieving the desired results and for reporting progress to regulatory agencies and the public.

The city's post-construction monitoring program addresses U.S.EPA and IDEM requirements for monitoring the performance of CSO control measures. The city will use the Performance Criteria in Table 7-5 as performance measures to gauge the effectiveness of long-term CSO control measures. The city will use its existing river monitoring network and locations to measure streamflow and water stage, continuous DO, water temperature, treatment plant effluent discharge, CSO activation and CSO flow. In addition, the city may, at its discretion, continue its monthly in-stream water quality sampling program for a variety of parameters. The city will submit milestone reports to the U.S. EPA and IDEM, as required, following completion of construction of all LTCP projects in a watershed. In addition, the city will prepare public reports describing progress in the design, construction, and effectiveness of water quality improvement projects. The city also will continue to implement its program to educate citizens on water quality issues and notify them of actual or impending CSO occurrences.